New polymer aimed at optical backplane market

Terahertz Photonics has unveiled its latest polymer, Truemode Backplane, designed to meet the demands of the emerging optical backplane market. Developed from its Truemode optical polymer family for telecom components, this new polymer uniquely enables high-speed optical interconnections within high performance computer and switch systems.

Terahertz says the polymer will address the need for increased backpanel bandwidth with the only waveguide material that has low loss temperature stability and photosensitivity. This combination of properties means that the polymer has both high optical performance and is also compatible with the techniques employed to manufacture electrical printed circuit boards.

Dr Frank Tooley, Chief Technology Officer at Terahertz Photonics, said, "It was a natural progression to extend the use of our Truemode polymer to backplane applications. Major players in the high end PCB expressed interest and we saw that we could be the first to market with a waveguide material that truly does what is required."

Research over a number of years has clarified the challenges that face the fabrication of optical backplanes. Critical amongst these is that waveguides must be optically written as the boards are around 1 metre in size. This requires a photosensitive waveguide material. In addition, waveguides must withstand high temperatures of around 280°C that occur in the solder reflow process. Finally, the efficiency of the waveguides in transmitting light must be very high to ensure good overall system performance. The company says its new backplane polymer is the first optical material that meets all of these requirements.

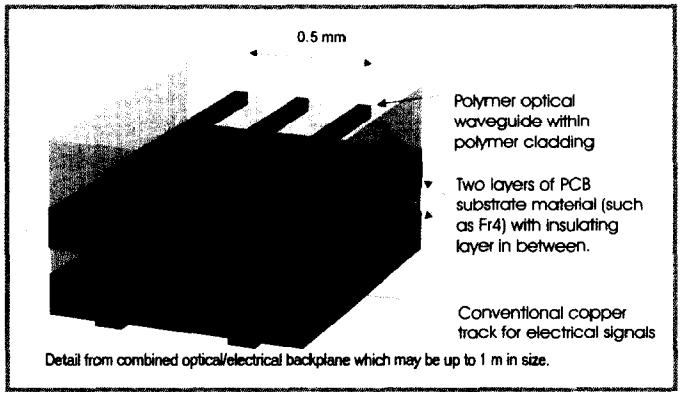
Dr Tooley continued, "The first optical backplanes to be widely adopted will have a combination of electrical tracks and optical waveguides. Telecom and Datacom systems designers will be excited not only by the extra speed of optics but also by the design freedom it provides."

The current rate at which a state of the art copper backplane transmits data is up to 3.2 Gbps. It is widely accepted that the transmission of signals across electrical backplanes at rates faster than this is not feasible as losses and crosstalk between channels seriously degrades the performance of a link. Transmission rates up to 40 Gbps are possible for optical backplane interconnects.

Terahertz says loss measurements for Truemode Backplane polymer are very low at 0.035 dB/cm. The degradation temperature of the polymer is high at >400 degrees C. In addition tests have shown good adhesion between the polymer and substrates used in PCB manufacture.

Equipments & Materials Processing

Philips has decided to discontinue its semiconductor ellipsometry equipment manufacturing activities in Almelo, the Netherlands, from July 2002. Ellipsometry has been part of Philips Analytical's semiconductor metrology line of products - the technique determines the thickness, refractive index and absorption constants of transparent thin films used for semiconductor production. Despite concerted efforts in the past, the company has decided it can no longer justify the investments needed to continue with the product line. It will, however, meet existing service and support commitments to customers. Philips Analytical will continue to focus on analytical instrumentation and software for industrial process control and R&D applications.



New polymer has high optical performance and is compatible PCB manufacturing techniques.

Hoya ventures into 3C-SiC

Hoya Corporation has established a venture company to develop and produce cubic silicon carbide (3C-SiC) The new company, Hoya Advanced Semiconductor Technologies, has initial funding of 350 million yen, and is headquartered in Akishima-City, Tokyo.

The new company has exclusive rights to the use of technologies and patents for SiC developed by Hoya Corporation. The technological features and patent developed by Hoya Corporation govern the manufacture of large-area 3C-SiC substrates at high growth rates, while decreasing crystal defects that degrade performance.

The new company will employ engineers and researchers from Hoya Corporation and will also seek external mid-career recruits. CEO will be Fumio Kitahara, while Dr. Hiroyuki Nagasawa will serve as CTO, following his work in developing 3C-SiC. Dr. Masayuki Abe will act as the Director of the Development Center of the new company.

The company aims to forge alliances with companies and universities worldwide to expand the wide-band-gap semiconductor market as quickly as possible. The company will introduce its original management system, including a stock option system, to recruit talented people. The total investment in plant and equipment will be 2.6 billion yen. Annual revenues are expected to reach 4 billion yen by FY2007, when the initial public stock offer will be made.

New x-ray scanner debuts at SMT

X-Tek Systems, the manufacturer of real-time microfocus x-ray systems, launched its advanced new Orbita x-ray system at SMT in Nuremberg.

Designed for the inspection of large circuit boards, the Orbita is believed to be the first microfocus x-ray system capable of providing an indexing 75° oblique view of PCBs whilst maintaining a true geometric magnification.

New standards

Designed for manual and programmed inspection of large area PCB's and electronic components, the Orbita sets new standards in performance and ergonomics, says X-Tek. The Orbita makes it easier for operators to produce scan results previously unattainable from x-ray systems.

Designed for inspecting BGA ball wetting, ball to pad delaminations, cracked BGA joints and lifted bond wires, the new scanner can achieve oblique angles of up to 75° by coupling both the x-ray source and imaging intensifier on a single axis.

Replacing a traditional tilt axis in this way ensures that the image remains in the centre of the region of interest at all angles of tilt.

For quick and effective scanning of single or multiple BGA balls, the Orbita's true concentric imaging operates over the entire scan area of the manipulator with the region of interest remaining locked regardless of a sample's position on the manipulator.

The company says that while traditional machines require the highly skilled tilt and rotate operations of the manipulator in three axes to give an unobstructed view of BGA balls, the unique true parallel tracking feature on the Orbita automatically maintains the X and Y axes parallel to the BGA so that rows can be more easily scanned using just a single X or Y-axis.

This parallel tracking feature is claimed to be unique to the Orbita's manipulator design and is fully independent of any control algorithms.

Fragile

A single fully programmable PC running X-Tek's own IXS integrated system software is used to control the x-ray source, the manipulator and image processing of the Orbita. New control software protects fragile samples by eliminating any potential risk of collisions between samples, the manipulator, imaging and the x-ray source.

The Orbita also incorporates X-Tek's fully integrated XI x-ray source along with the latest two micron target. It features an ultra thin beryllium window which the company says provides a brighter image with enhanced resolution and geometric magnification up to 2400x.

New x-ray system is capable of an indexing 75° oblique view while maintaining a true geometric magnification.

GlobiTech moves into Si-28

Isonics Corporation has qualified GlobiTech Incorporated, an epitaxial wafer foundry located in Sherman, Texas, to produce silicon-28 epitaxial wafers using silicon-28 trichlorosilane. Isonics has also agreed to work with GlobiTech to supply silicon-28 wafers to certain GlobiTech customers. Dr. Stephen Burden, Isonics' Vice President of Semiconductor Materials, commented, "GlobiTech has a world class epi facility that can meet the requirements for 0.13 micron and below technology, essential to make next generation micrprocessors. Having GlobiTech as a qualified supplier allows Isonics additional flexibility to supply all sizes of silicon-28 wafers to the semiconductor industry."

"Silicon-28 provides a synergistic relationship for Isonics, GlobiTech and our customers," said Keith Lindberg, Vice President of GlobiTech. "As Moore's Law begins to run into physical limitations, engineered material solutions are becoming increasingly important. We feel that the improved thermal conductivity of silicon-28 should present unique solutions for advancements in IC performance and reliability."

Isotopically purified silicon-28 has 60% higher thermal conductivity than natural silicon and can reduce the self heating of integrated circuits and help solve thermal management problems in a wide range of semiconductor devices currently fabricated using conventional silicon wafers.

Max Planck Institute bonds with SUSS

SUSS MicroTec has expanded its collaboration with the Max Planck Institute (MPI) of Microstructure Physics in Halle, Germany, with the delivery of its CL200 Fusion Bonder to MPI's wafer bonding research facility, Experimental Department II. The research facility will use the CL200 for testing silicon on insulator (SOI) and fusion bond applications.

"The CL200 allows SOI fabrication from two bonded substrates, and combines the microcleanroom concept pioneered in our research group and a new megasonic cleaning concept in an ideal way which clearly extends the capabilities of previously available equipment," said Professor Dr. Ulrich M. Goesele, director at the MPI Halle. "The CL200 is the fifth SUSS tool the institute has acquired. It already uses a SUSS spin coater, mask aligner, wafer cleaner and a substrate thermal compression bonder."

Experimental and theoretical research carried out at MPI Halle is primarily focused on solid-state phenomena that are determined by small dimensions, surfaces and interfaces. Present research interests include electrical properties of bonded interfaces, ultra-high vacuum bonding for the fabrication of spin-valve transistors and bonding of compound semiconductors and SOI wafers. SOI is becoming a mainstream material in the semiconductor industry because it overcomes challenges in CMOS microprocessors that result from further scaling down structure sizes and increasing clock speeds. CMOS transistors made on SOI switch faster, consume less power and generate less heat.

SUSS MicroTec's CL200 is used to remove particles or contaminants from substrates prior to pre-bonding in the tool and subsequent post bonding in a high temperature environment. It cleans, dries, aligns and bonds in one closed chamber within specific atmosphere. It is unique in that it processes two substrates simultaneously, while its closed chamber atmosphere produces high yield and high throughput without post-clean contamination.

Increased tool uptime

KLA-Tencor has introduced its new iPartner customer support scheme, designed to address the needs of semiconductor fabs to remain competitive by reducing the service costs associated with their KLA-Tencor tools, while at the same time increasing tool uptime. Based on the company's iSupport technology, the iPartner program creates a partnership between the customer and KLA-Tencor's on-site and online resources, allowing customers to tailor their support level to match their unique manufacturing requirements. A number of customers working with KLA-Tencor in the development of the iPartner program have already received the benefits of reduced service costs and increased uptime, says the company.

"Atmel has seen cost savings and improvement in the performance of KLA-Tencor's 2139 patterned wafer inspection and SP1 unpatterned wafer inspection tools as a result of this new level of diagnostics support," said Donn Turner, equipment operations manager for Atmel's Fab 8 in Irving, Texas. "KLA-Tencor's new approach to customer support has helped us to improve mean time to repair (MTTR) and ownership costs, boosting overall tool effectiveness. Suppliers that offer robust remote diagnostics solutions, such as KLA-Tencor, are raising the bar for other equipment vendors."

"The iPartner program is a response to our customers' needs for reduced service costs. We are the first company in the semiconductor industry to offer 7x24 online support at no additional cost," said Mike Allison, vice president and general manager of KLA-Tencor's Global Support Services. "Coupled with on-site support, the iPartner program provides functionality to significantly enhance the effectiveness of the customer's own support staff in resolving tool issues. As a result, MTTR can be reduced, positively impacting tool uptime and ultimately fab profitability, all while helping to reduce overall service costs."

VLSI names Q2 2002 Top Suppliers

US manufacturers held the largest market share at the Top five suppliers during the first quarter of 2002. Japanese suppliers were next followed by one European supplier.

Applied Materials was almost twice the size of the second largest supplier, Tokyo Electron. Meanwhile, the top three companies remain unchanged from the previous quarter with Applied Materials, Tokyo Electron Limited and Nikon all maintaining their positions, notching up sales of $1052 million, $581 million and $364 million, respectively.

Quarterly Chip Equipment Sales Top Five

Current Rank	Company	1Q 2002 Sales ($M)	Share (%)
1	Applied Materials	1052	16%
2	Tokyo Electron Limited	581	9%
3	Nikon	364	5%
4	KLA-Tencor	353	5%
5	ASM Lithography	341	5%
	Other	4090	60%
Total	6781		

SECAP plans 300mm Electroplating Bumping Line in Asia

The Semiconductor Equipment Consortium for Advanced Packaging (SECAP) announced at SEMICON West 2002 that it will install a complete 300mm line for wafer bumping and wafer-level packaging (WLP) in Asia using electroplating technology.

The line will be installed at Unitive Inc.'s affiliated company UST located in Hsinchu, Taiwan and is set up to demonstrate and provide high-volume manufacturing capability. This is the first fully integrated 300 mm line of its kind for SECAP specifically targeted at WLP equipment optimisation and product harmonisation for high-volume production. The ine will be installed in the fourth quarter of 2002 and operations are scheduled to begin in the first quarter of 2003.

The 300mm line will be available to customers and prospective customers of the SECAP member companies for equipment demonstration and evaluation of process technology, including integrated device manufacturers (IDMs), foundries and merchant bump foundries (post-foundries). The line will also be available to SECAP associate material suppliers for advanced research and design of new packaging materials.

"The industry's transition to 300mm technology thus far has focused heavily on front-end equipment and process issues," said Franz Richter, SUSS MicroTec CEO. "But back-end processes also need to be performed at the wafer-level. Interest in 300mm process equipment for wafer bumping and wafer-level packaging has increased significantly in the last 12 months, not only for microprocessors including FPGAs, ASICs, graphical chip sets and memory devices.

SECAP believes that Unitive is the ideal partner for this project because Unitive is already using SECAP equipment in its 200mm lines and has a leading electroplating and redistribution technology. Therefore, qualification of SECAP 300 mm equipment for the Unitive process will prove the capability of SECAP equipment for the most demanding wafer-level packaging technology. The entire industry will benefit from this project."

Interdependency

The SECAP line enables member companies to optimise their equipment for the integrated process flow of typical wafer bumping lines. A seamless process flow is crucial for a successful move to WLP, since different equipment technologies cannot be viewed in isolation because of the interdependency and integration required to establish a complete process line.

"The SECAP line harmonises the different types of equipment and processes used for advanced packaging and features electroplating as the enabling method of solder bump deposition," said Ray Thompson, Semitool CEO. "The lithography process, for example, cannot be addressed independently of the metallisation techniques nor template removal steps. All processes influence each other so it is important to work toward an integrated and cost-effective approach. The added complexity of 300mm challenges equipment companies to integrate solutions together with our customers."

"Electroplating will become particularly important for 300mm technology, and Unitive's Xtreme wafer-level chip scale packaging offers the industry highest cost savings for manufacturing these large wafer sizes," added Ken Donahue, Unitive CEO.

"The transition from 200mm to 300mm is a challenging project for bump foundries. The cooperation with SECAP allows us to directly transfer our technology to 300 mm with the same proven equipment suppliers from our 200 mm lines. In addition it will enable IDMs and foundries to qualify technology and equipment for 300mm wafers."

While full details of the agreement were not revealed, SECAP said this would be a joint venture between Unitive and the equipment suppliers within SECAP.

The equipment suppliers within SECAP will participate in the line with installation of their latest 300mm equipment, including SECAP's newest member NEXX Systems. Unitive will invest in equipment, ancillary support equipment and infrastructure to support the line.

According to the SECAP charter, SECAP will remain neutral to all packaging technologies; as such Unitive will not become a member of SECAP. The SECAP consortium does not intend to develop or market packaging technologies, since its purpose is to create a non-competitive environment for its customers. All companies in the consortium will remain independent, marketing their own products in their existing business areas.

Established in July 2000, SECAP is a consortium of leading equipment suppliers to the advanced packaging industry. Current members include Semitool, Suss MicroTec, Image Technology, Matrix Integrated Systems, NEXX Systems, Electroglas and the Fraunhofer Institute for Reliability and Microintegration (IZM) in Berlin.

SECAP concentrates on the development and validation of process equipment for the industry's conversion to wafer level packaging and 300mm wafers.

Consultancy

The Fraunhofer Institute acts as a consultant and technical link between the equipment suppliers to identify specific equipment requirements and acts as the application centre for process sequence integration between the different partners' equipment and operates the SECAP process line.

The SECAP consortium does not plan to develop or market packaging technologies, since its purpose is not to create a competitive situation with the customers of the equipment companies involved, but insteadworks to support the development and adaptation of advanced packaging technologies in the semiconductor industry.